

I CLAIM:

1 1. An aperture forming means for packages or
2 containers comprising a break away tip member made of
3 thermo-formed plastic comprising a hollow protrusion from
4 a surface whose entire intersection with said surface
5 comprises a locus of a fault line.

1 2. The aperture forming means of claim 1
2 wherein said hollow protrusion is frusto-conical.

1 3. The aperture forming means of claim 1
2 wherein said surface having said hollow protrusion sits
3 atop a covered cylindrical base member formed and
4 protruding from a thermo-formable plastic film.

1 4. The aperture forming means of claim 1
2 wherein said hollow protrusion is relatively shallow, said
3 hollow protrusion having at least one side indent.

1 5. The aperture forming means of claim 1
2 further comprising at least one additional hollow
3 protrusion adjacent said covering cylindrical base member.

1 6. The aperture forming means of claim 5
2 wherein said at least one additional hollow protrusion is
3 a cap member for said hollow protrusion.

1 7. The aperture forming means of claim 6
2 wherein said cap member has an inward protrusion and said
3 cylindrical base member has a related cap member, such
4 that when twisted, said cap member is compressed into said
5 cylindrical base member.

1 8. The aperture forming means of claim 6
2 wherein said cap member is tapered.

1 9. The aperture forming means of claim 3
2 further comprising at least one additional hollow
3 protrusion so shaped as to function as a cap member to fit
4 snugly about said ~~covered cylindrical~~ base member, and ~~over~~
5 said hollow protrusion.

1 10. The aperture forming means of claim 5
2 wherein said at least one additional hollow protrusion has
3 an open end and a closed end, said open end being a cap
4 member and said closed end being a punch/plug.

1 11. The aperture forming means of claim 5
2 wherein said one additional hollow protrusion is so shaped
3 as to function as a cap member with a centrally formed
4 punch/plug extending along a longitudinal axis within said
5 at least one additional hollow protrusion.

1 12. The aperture forming means of claim 5
2 wherein said at least one additional hollow protrusion is
3 so shaped as to function as a tool member atop of a cap.

1 13. The aperture forming means of claim 5
2 further comprising a portion of a thin gauge material
3 adjacent to and between said protrusion and said at least
4 one additional hollow protrusion so cut as to form a
5 tether therebetween.

1 14. An aperture forming means comprising a
2 protrusion which is cylindrical, said protrusion being
3 formed from thermo-formable plastic with one integral
4 covered end, said covered end having a fault line pattern
5 which pattern, when pressed into a space defined by said
6 protrusion, ruptures in a predetermined pattern to create
7 a predetermined aperture.

1 15. The aperture forming means of claim 14
2 wherein said fault line pattern creates a circular
3 aperture.

1 16. The aperture forming means of claim 14
2 wherein said fault line pattern creates a polygonal
3 aperture.

1 17. The aperture forming means of claim 14
2 wherein said protrusion is a hollow mound.

1 18. An aperture forming means comprising a
2 thermo-formed member having a hollow frusto-conical
3 protrusion from a surface atop a hollow cylindrical based
4 member wherein an intersection of said hollow frusto-
5 conical protrusion with said surface atop said hollow
6 cylindrical based member comprises a locus of a fault line
7 to create a break away tip with an adjacent tethered cap
8 member, said break away tip and said tethered cap member
9 being securely sealingly attached to a container wherein
10 said cylindrical based member is located directly over a
11 hole in said container.

1 19. Apparatus to form a hollow protrusion from
2 heated thermoplastic film where said hollow protrusion
3 intersects said heated thermoplastic film, said entire
4 intersection comprising the locus of a fault line,
5 including:

6 (a) punch means comprising a tip portion
7 with a shallow frusto-conical formation at the base of
8 said tip portion; and 1.a.b

9 (b) a female die having an accurately
10 bored hole in a flat die block, said hole of slightly
11 larger diameter than the base of said tip portion of said
12 punch means, so dimensioned that when said punch means is
13 introduced into said female die when forming said heated
14 thermoplastic film the base rim, if advanced to contact
15 said frusto-conical formation, the locus of such contact
16 would be a circle located approximately centrally between
17 the larger base circle and the smaller end circle of the
18 frusto-conical formation.

20. Apparatus to form a hollow protrusion from heated thermoplastic film where said hollow protrusion intersects ~~said~~ heated thermoplastic film, said entire intersection comprising the locus of a fault line, including:

- 505
B1
1. a supply of thermoplastic film;
2. means to controllably heat a section of said film;
3. means to transfer said heated film section to the locus of the center of said apparatus;
4. punch means comprising a tip-portion with a shallow frusto-conical formation at the base of said tip portion extending from a shaft;
5. resiliently mounted film clamp means with a central hole through which said punch member may pass;
6. guided mounting plate means to which said clamp means and punch means are concentrically mounted with said punch means located beneath the clamp face of said resilient clamp means and concentric with its central hole to reciprocatingly and controllably advance and retract said resiliently mounted film clamp means and punch means with respect to a female die; and
7. a female die having an accurately bored hole in a stationary flat die-plate located in accurate alignment with said punch means, said bore diameter so dimensioned that when the punch means is advanced said bore rim would be in accurate alignment with said shallow frusto-conical formation at the base of the punch tip and if advanced to contact said shallow frusto-conical formation the locus of said contact would be a circle located approximately centrally between the larger base circle and the smaller end circle of said shallow frusto-conical formation.
1. a. b

21. Apparatus to form a hollow protrusion from heated thermoplastic film where said hollow protrusion intersects said heated thermoplastic film, said entire intersection comprising the locus of a fault line, which hollow protrusion extends from a closed hollow essentially cylindrical base portion, including:

(a) punch means comprising a tip portion with a shallow frusto-conical formation at the base of said tip portion;

(b) a spring loaded self-centering retractable female die member configured to mate with said punch means, and

(c) a spring loaded film clamp means with a central hole through which said punch member may pass, cylindrical means extending from said central hole whose outer diameter functions as a punch means to form the inside diameter of the closed hollow essentially cylindrical base portion and whose height forms the inner height of said protrusion when cooperating with said female die member.

22. The apparatus of Claim 21 where the female die member includes a ball ended base, wherein movement of said female die member is limited in one direction by the ball ended base contacting an adjustable stop means, a spring member seated on said adjustable stop means compressor against a flange located on the female die member pressing said flange against a fixed stop means to encapture the female die member.

23. The apparatus of Claim 21 including additional means to form an adjacent cap member protrusion and tether from said heated section of thermoplastic film, said additional means comprising:

(a) secondary punch means comprising a tip so shaped as to create a hollow thermoplastic cap member with tapered walls to firmly engage said hollow essentially cylindrical base portion when used in conjunction with a cooperating female die member;

(b) a female die member comprising a hole in a plate of such dimension as to allow punch member and heated thermoplastic film to pass through it with low resistance;

(c) said punch and die means located adjacent to said apparatus to form said hollow cap member at such distance as to permit a cutting means to create a tether between said cap means and said hollow base portion; and

(d) cutting means to create a tether.

24. Apparatus to form a hollow tapered protrusion from heated thermoplastic film where a fault line may be formed encircling an outer surface of said protrusion at various predetermined heights including:

(a) punch means comprising a tapered tip extending from a round shaft member;

(b) a film stop plate with a hole so sized as to permit said punch means and said heated thermoplastic film being formed to pass through to reach a female die means;

(c) female die means comprising a bored die block, said bore to be of such diameter as to locate the fault line on the outer surface of the tapered member protrusion at a predetermined location when cooperating with said punch member.